REMARKS

The present Response is intended to be fully responsive to all points of objections and/or rejections being raised by the Examiner and is believed to place the application in condition for allowance. Favorable reconsideration and allowance of the application are respectfully requested.

Applicants assert that the present invention is new, non-obvious and useful. Prompt reconsideration and allowance of the claims are respectfully requested.

Status of the Claims

Claims 1-3 and 6-19 are pending in the application. Claims 4-5 and 20 have been cancelled without prejudice. Claims 1-2, 8, 10, 12-13, 15, and 17-18 have been amended to more accurately describe the claimed invention. Claims 3 and 6 have been amended to correct formal matters. Applicants respectfully submit that the amendments to the claims do not add new matters.

Remarks to Claim Rejections

Claim Rejections - 35 USC §102

In the Office Action, the Examiner rejected claims 1, 3, 8-11, 13-16, and 19 under 35 U.S.C. §102, as being anticipated by Churchill et al. (Semicond. Sci. Technol. 6 (1991) 18-26). Also, the Examiner rejected claims 1 and 6 under 35 U.S.C. §102, as being anticipated by Presting et al. (US 6,043,517). Additionally, the Examiner rejected claims 1-3, 8-11, 13-16, 18, and 19 under 35 U.S.C. §102, as being anticipated by Werner et al. (US 2004/0140531).

Applicants have amended independent claims 1, 8, and 13 to include a further limitation that the substrate, whereon a layer of SiGe is formed, is a silicon-on-insulator (SOI) structure or a SiGe-on-insulator (SGOI) structure. This limitation was previously included in dependent claims 4 and 5. As a result of this amendment, Applicants have cancelled claims 4 and 5 without prejudice.

Applicants respectfully submit that the limitations of previous dependent claims 4

and 5, now in independent claims 1, 8, and 13, are not taught, suggested, or implied by prior art references of record, in particular, Churchill et al., Presting et al., and Werner et al.. In addition, Applicants respectfully assert that the limitations of previous dependent claims 4 and 5 are not obvious, as discussed below in detail with regard to claim rejection under 35 U.S.C. §103, based on Churchill et al. in view of Fukuda et al. (US 2004/0004271). Therefore, Applicants respectfully submit that the amended independent claims 1, 8, and 13 include distinguishing elements that are patentable over all the prior art references of record.

Claims 2-3 and 6 depend from claim 1, claims 9-11 depend from claim 8, and claims 14-16, 18, and 19 depend from claim 13. Thus, claims 2-3, 6, 9-11, 14-16, 18, and 19 include the distinctive elements of claims 1, 8, or 13 in addition to other distinctive features. Therefore, claims 2-3, 6, 9-11, 14-16, 18, and 19 are patentable for at least the reasons as described above with regard to claims 1, 8, or 13.

In view of the above remarks, Applicants respectfully request that rejections of claims 1-3, 6, 8-11, 13-16, 18, and 19 under 35 U.S.C. §102 be withdrawn.

Claim Rejections - 35 USC §103

In the Office Action, the Examiner rejected claims 4, 5, 7, 12, 17, and 20 under 35 U.S.C. §103(a) as being obvious over Churchill et al. in view of Fukuda et al.. In particular, the Examiner contends that claim 4 would have been obvious by incorporating a silicon-on-insulator (SOI) substrate taught by Fukuda et al. into the method and device taught by Churchill et al. and by claims 1 and 13 of the instant application. Similarly, the Examiner contends that claim 5 would have been obvious by incorporating a SGOI structure taught by Fukuda et al. into the substrate taught by Churchill et al. and by claim 1 of the instant application. The Examiner further contends that the motivation for doing so is to increase the operational speed of the MOSFET device, as expressly taught by Fukuda et al.

Applicants respectfully disagree with the Examiner's claim rejections.

Applicants respectfully submit that prior art reference Churchill et al. does not provide any motivation to be combined with prior art reference Fukuda et al.. Neither

Fukuda et al. provide any motivation to be combined with Churchill et al., in contrary to the contention about motivation made by the Examiner.

MPEP 2143.01 states that "obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there are some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art".

Prior art reference Churchill et al. describes a Si/Ge short period superlattice that allows direct optical transitions across the superlattice bandgap. The main interest of Churchill et al. is in the structural investigation of the superlattice through measurement techniques such as those listed in length in the reference. Churchill et al. never mentioned about speed of operation of the superlattice, nor any desire or interest to increase such speed that is not even mentioned in the reference. In the meantime, Fukuda et al. does not offer the teaching of increasing the speed of operation of a superlattice, but rather that of a MOSFET device which is non-existent in the prior art reference Churchill et al. at all. Therefore, Churchill et al. clearly offers no motivation to be combined with Fukuda et al.

On the other hand, prior art reference Fukuda et al. describes the preparation of a semiconductor substrate, and the use of silicon-on-insulator (SOI) or SiGe-on-insulator (SGOI) to increase the speed of operation of MOSFET devices. However, Fukuda et al. never indicated any desire or interest in combining a MOSFET device with a superlattice, described in Churchill et al., which is mainly used in a photodetector to allow direct optical transitions. In fact, a person skilled in the art will easily recognize that Fukuda et al. and Churchill et al. are in different fields of applications of semiconductor and so may never come to anywhere near such motivations as to combining the teaching of Churchill et al. with that of Fukuda et al.

In the Office Action, the Examiner contends that the motivation for combining Churchill et al. with Fukuda et al. is to increase the operational speed of the MOSFET device. Applicants respectfully disagree with the Examiner's contention. Incorporating a superlattice taught by Churchill et al. into a MOSFET device having a substrate of SOI or SGOI taught by Fukuda et al. will most likely not increase the operational speed of the

MOSFET device at all. The operational speed of the MOSFET device may be affected by the SOI or SGOI substrate structure itself, by clearly not by the incorporation of the superlattice as taught by Churchill et al..

In addition, MPEP 2143.01 states that "the prior art must suggest the desirability of the claimed invention", and "the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination". Prior art references Churchill et al. and Fukuda et al. never suggest the desirability of the claimed invention, that is, "the combined SiGe layer is characterized as a digital alloy of Si and Ge having a thermal conductivity greater than that of a random alloy of Si and Ge", which is clearly set forth in the independent claim 1 from which claims 4 and 5 depend.

Moreover, MPEP 2143 states that, in order to establish a *prima facie* case of obviousness, the teaching or suggestion to make the claimed combination and the reasonable expectation of success "must both be found in the prior art, not in applicant's disclosure" (emphasis added). Based on this, Applicants respectfully submit that the teaching of Fukuda et al. on SOI and/or SGOI substrate cannot be combined with the Applicants' own teaching such as those taught by independent claims 1 and 13 of the instant application.

Applicants would like to further point out that in fact prior art reference Churchill et al. may not be combined with prior art reference Fukuda et al., in particular when a substrate of SiGe-on-insulator (SGOI) is used. Churchill et al. emphasizes that "we have gone to some lengths to characterize the samples, in particular to assess interface quality and to ensure that the germanium layers are properly strained and relatively free from dislocations" (page 19, col. 2, lines 6-9, emphasis added). A person skilled in the art will thus recognize that Churchill et al. requires the Si sublayers inside the superlattice structure and the Si overlayer on top thereof being unstrained (while the Ge sublayers being properly strained). However, combining Churchill et al. with Fukuda et al. to grow a superlattice on top of a SGOI substrate will likely result in not only strained Ge sublayers but also strained Si layer or sublayers and works against the expressed desire of Churchill et al. This is also in direct contrary to the requirement of MPEP 2143.01 which

specifically states that "the proposed modification cannot render the prior art unsatisfactory for its intended purpose".

In view of the above remarks, Applicants respectfully submit that amended claims 1, 8, and 13, which have now incorporated the limitations of previous claims 4 and 5, are not obvious over Churchill et al. in view of Fukuda et al., and therefore are patentable over all the prior art references of record. Applicants have cancelled dependent claims 4 and 5 without prejudice in view of the amendment of claims 1, 8, and 13.

Claim 7 depends from claim 1, claim 12 depends from claim 8, claim 17 depends from claim 13, and thus claims 7, 12, and 17 include, respectively, all the distinctive elements of claims 1, 8, and 13. Therefore, claims 7, 12, and 17 are patentable for at least the reasons as described above with regard to claims 1, 8, and 13.

Claim 20 has been cancelled without prejudice.

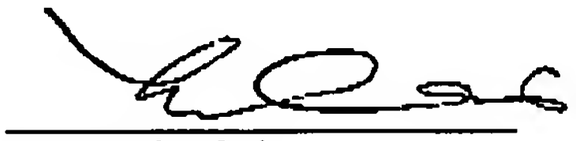
In view of the above remarks, Applicants respectfully request that rejections of claims 4, 5, 7, 12, 17, and 20 under 35 U.S.C. §103(a) be withdrawn.

Conclusion

In view of the preceding remarks, Applicants respectfully submit that all pending claims are now in condition for allowance. Favorable reconsideration and allowance of the claims are respectfully requested.

No fees are believed to be due in connection with this paper. However, if there is any such fee due, please charge any such fee to the deposit account No. 09-0458.

Respectfully submitted,



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